CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

COUNTRY USSR

DATE DISTR. 2 APR 1954

SUBJECT Information Concerning the Ilich Metallurgical Plant No 104, Mariupol, USSR

NO. OF PAGES 7

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PLACE ACQUIRED

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NO. OF ENCLS. (LISTED BELOW)

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SUPPLEMENT TO REPORT NO.

DATE OF INFORMATION

THIS IS UNEVALUATED INFORMATION

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that in the Soviet, the individual worker knows only a very narrow phase of overall production; that technical engineers never discussed the results of their work in their respective shops and sections; that a strict system of passes, good for one specified shop and one specified gate was used and finally, because of the atmosphere of constant fear among the people, curiosity is discouraged.

2. The Ilich Plant No 104 is a complete production plant. It has blast furnaces, Martin furnaces (open hearth shops), rolling mills and thermic treatment (processing) shops. It is one of the best (if not the best) metallurgical plants in the Soviet Union. I am convinced that it was, and probably still is, the major military plant manufacturing armor steel. I am of the opinion that it may be the largest plant manufacturing both heavy armor-plate steel for naval ships and light armor-plate steel for tanks. There were between 1500 and two thousand workers and about five hundred engineers and technicians at this plant. Prior to 1937 the plant belonged to "Trubostal" (Steel Piping Administration). It was transferred in 1937 to the newly established People's Commissariat for Defense. Later on, when the problem of building a powerful navy became the issue of the day, it was transferred to the People's Commissariat of Ship Building Industry.

3. The Ilich Plant was to play an important part in this new naval program for the following reasons:

   a. The Plant had relatively new equipment already designed for similar production processing. There were two small-capacity blast furnaces with auxiliary equipment (Cowper stoves and blowing machines) required to produce high quality cast iron for manufacturing steel. There was a new Martin furnace shop, a Martin furnace shop for acid steel and a shop for thermic treatment with various tubs for steel tempering. All equipment

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was in good condition.

b. The plant was manned by highly qualified workers, of which there was a shortage in the Donets Basin. There were at least five hundred highly qualified engineers and technicians. Being a military plant, it enjoyed a priority in getting the best specialists and then, too, specialists who had a choice preferred the Mariupol resort-like life and the abundance of food in the area.

4. The plant was located near the railroad station of Sartan on the South-West Railroad System (four kms north of Mariupol). It consisted of two separate units: /see Enclosure (A)/.

a. Plant "A", which formerly belonged to the Nikopol-Mariupol Mining and Metallurgical Company.

b. Plant "B", which was formerly the joint-stock company, Russian Providence.

Plant A

5. In Plant A there was a blast furnace shop with two blast furnaces, one with a capacity of 480 cubic meters and the other, 430 cubic meters. Both furnaces put out a combined total of eight hundred tons (metric) of cast iron per day. I believe that there were 250 "hot" (actual production) days per year at a maximum. Therefore, the annual production of foundry iron and cast iron for steel production was two hundred thousand tons.

6. There were two Martin furnace shops in Plant A: the old and the new. The old shop had six furnaces, as follows:

Furnace #1 - weight of one smelting - 50 tons per day: 2½ smeltings - 125 tons
Furnace #2 - weight of one smelting - 50 tons per day: 2½ smeltings - 125 tons
Furnace #3 - weight of one smelting - 50 tons per day: 2½ smeltings - 125 tons
Furnace #4 - weight of one smelting - 50 tons per day: 2½ smeltings - 125 tons
Furnace #5 - weight of one smelting - 65 tons per day: 2½ smeltings - 160 tons
Furnace #6 - weight of one smelting - 65 tons per day: 2½ smeltings - 160 tons

Daily Total 820 tons

(Time lost - hot and cold - constituted at least 1/3 of the total; subsequently, the furnaces worked not more than 240 days per year. Therefore, using an average daily output of 820 tons and 240 working days per year, the annual output of this shop was 196,800 tons (metric)).

The new Martin furnace shop with four furnaces:

Furnace #7 - weight of one smelting - 50 tons per day: 2½ smeltings - 125 tons
Furnace #8 - weight of one smelting - 65 tons per day: 2½ smeltings - 160 tons
Furnace #9 - weight of one smelting - 75 tons per day: 2½ smeltings - 185 tons
Furnace #10- weight of one smelting - 75 tons per day: 2½ smeltings - 185 tons

Daily Total 655 tons

(Annual Production: 655 tons x 240 tons or 157,000 tons.)

7. Figuring a total annual production of both old and new Martin furnace shops of 355 thousand tons less a 10% defective rate of production (the official allowance was four per cent, but often reached 15%,) the actual annual production was about 320 thousand tons. (I believe the official Soviet statistics estimated the annual production of both shops to be four hundred thousand tons.)

8. The two Martin furnace shops manufactured the following types of steel:

a. ST-1; St-2; ST-3; ST-4; ST-5. ST-1 and ST-5 were manufactured on rare occasions only, while ST-3, rolled into sheets, accounted for about 60% of the total of all the above types. 50X1

b. Auto steel 1005; 1010; 1015; 1020; and 1025. These types were rolled into thin sheets and used mainly by the auto and tractor industry.

c. Steel for seamless tubing; MS and MD, used by the oil industry.

d. Other types were made in small quantities, such as SDS Corrous steel (stainless) 50X1 As a rule, these two shops did not produce any special types of steel.

8. All steel was poured into molds of the following shapes: /attached sketch/.

a. flat sheet
b. square
c. round
d. octahedral

The weight of the ingots varied from six hundred kg to 27 tons. These 27 ton ingots were flattened until they were approximately 150-170 mm thick and were sent to the Lugansk locomotive plant for manufacturing chassis for FD locomotives. Towards the end of 1939 or the beginning of 1940 the new Martin shop began to manufacture 109 ton (exact weight) ingots. They were rolled and subjected to thermic treatment in Shop No 3. From the information 50X1 it was a special steel containing about 2.4% of chrome, 0.7% nickel and probably 0.4% of molybdenum. It was sent to Leningrad for testing and I believe it was to be used for gun turrets on naval ships.

9. There were seven or eight rolling mills altogether in Sheet Rolling Mill Shop No 1 and Sheet Rolling Mill Shop No 2. The most powerful mill had a 1,100 mm (diameter) roller and the least powerful, 650 mm. Sheet Rolling Mill No 3 (later changed to No 8) was engaged in rolling KhNM and KITS and other special types of steel. The work was all secret. KITS-thin was used for tank armor. The plates 50X1 were of various sizes, the most common being 1 x 1 mm and was up to 10 mm thick. KhNM-thick ship armor was 20 to 30 mm thick and the plates 50X1 3 x 6 mm and 3 x 3 mm. Shop No 3 had one single rolling mill with a diameter of 1,250 mm. During 50X1 the latter part of 1939 Shop No 3 was equipped with a powerful press the exact size or capacity. There were eight or ten thermic ovens and several 50X1 tubs for thermic treatment. the chemical composition of steel produced in Shop No 3, but believe it was of a chrome-nickel type, 2.5% chrome and 0.7% nickel.

10. The rate of defective production in Shop No 3 was very high. All production was tested at the Leningrad test grounds with naval artillery. When the plates tested could not withstand a hit it was talked about by engineers "the shell cut through the plate as if it were made of butter". In 1937 almost all experienced engineers were arrested in Shop No 3 for some reason and good production for six or seven months was only 0.67% (exact) of the total capacity. 50X1

11. Other buildings and shops in Plant A area were as follows:

a. Mechanical Shop No 1 where armor plates were processed; after thermic treatment they were bent, drilled, and shaped as required. There were several flame-cutting machines in this shop for cutting armor plate in one operation.

b. Mechanical Shop No 2 served mainly as a repair and maintenance shop.

c. A foundry shop took care of the needs of the plant and also filled some orders from outside.

d. A welding shop (there may have been two) for welding iron pipes.

e. A tube manufacturing shop which made Manesman seamless tubes. Originally part of the plant, it was detached in 1938 and organized as a separate plant known as Kuibyshev Seamless Tube Plant.

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f. There was a furnace-charge shop (where charges were prepared). A typical charge for a Martin furnace was prepared as follows:

1) Scrap iron (from junk yards and the rolling mills).

2) Liquid cast iron produced by the blast furnaces of the plant.

3) Specular cast iron (for the best type of steel) brought from a plant at Almaznaya.

4) Iron ore - came exclusively from Zaporozhe..

5) Ferroalloy - from the Zaporozhe ferroalloy plant.

6) Ammonium, for deoxidation, came from a small ammonium plant in Kharkov.

g. A transportation shop (for needs of plant).

h. A Firing Range located about six km from the plant on the open steppe. Tank armor plate was tested here with heavy machine gun fire.

i. A new thermic treatment shop.

j. A press shop (actually two shops, No 14 and No 15. Although constructed just before 1940 they were not in full operation. These two shops as well as the Martin furnaces of the Kuibyshev plant were constructed by prisoners from Camp Staryy Krym).

k. Experimental shop. Included were:

1) Chemical laboratory

2) X-ray laboratory.

3) Metallographic laboratory.

4) Research groups for blast furnaces, Martin furnaces, rolling mills and silicate. The main task of these groups was to reduce the very high percentage of defective production. They were also responsible for making sure that instructions on the "technological cards" (prescriptions for manufacturing new types of steel) were complied with. A technician observer would be sent to a particular shop. He made an accurate, minute-by-minute record of the whole technological process and on the basis of several such studies, would compile and determine the optimum conditions for given processes. However, no substantial results were obtained because as a rule the shop engineers would completely disregard the study.

l. The Mariupol heat and power station was located in Plant A area.

12. Plant B area was made up as follows:

a. Martin Furnace Shop B. There were five furnaces (acid), each with a charge capacity of 30 to 35 tons or a total of 150 to 175 tons. Each smelting required seven hours (with one hour between each two smeltings). Thus there were 2½ smeltings per day making a daily production total of 375 tons. Assuming that there were 250 "hot" days a year, total annual output should have been 93,750 tons. The percentage of defective production was much lower in this shop than in those already described and the annual actual production figured about 90 thousand tons. This shop had a special "Chief Foreman" whose sole responsibility was to see that the furnaces were kept in top condition. The furnace charge used was of the highest quality and the purity of the metal scrap used was closely inspected. KhNM and KITS types of steel were made here, as well as commercial types. I do not know the ratio of production. The work in this

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50X1 shop was classified as the most secret project of the entire plant. Even the shift engineers and foremen were not aware of the overall
50X1 production process.

50X1 the shop made various types of steel because
50X1 ferrotitanium (FeTi) ferrovanadium (FeV) and ferrotungsten
(FeW) in its supply room. There was an electric furnace with a
50X1 10 to 12 ton capacity in the shop, making steel for the steel foundry.
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b. Section mill shop. This shop had the following three section mills:

1. For rails and beams Zaporozh.je.
2. Medium grade
3. For small-sized sheets zh.je

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c. In Plant B area there was also a dolomite shop and four batteries of coke ovens (Konne type) with an annual output of not more than 250 thousand tons.

13. The Central Armor Laboratory No 2 (TsBL-2) attached to the Ilich Plant was a branch of the Leningrad Research Institute No 78. The task of the Leningrad Research Institute No 78 was to study and improve ship armor plant. The branch at the Ilich Plant (TsBL-2) employed about fifty persons, including some 15 engineers. There were also a manager, a chief engineer, as well as researchers, engineers, technicians and observers.
50X1 . All work was highly classified and individual researchers knew only a small portion of the entire work done by the laboratory. Researchers conducted observations in various shops of the methods and conditions used in smelting, rolling and thermic treatment processes. Based on numerous observations, the most favorable methods and conditions were determined. Initial stages of manufacture of new types of steel were supervised by TsBL-2 engineers and not by shop engineers. Research was conducted in the Martin furnace shop "B", sheet rolling mill shop No 3, and in the special laboratories equipped with steel founding machines of various capacity. One of these furnaces
50X1 (capacity 20 kg) was received from the US in late 1939 or early 1940.
50X1 There were also small capacity furnaces of 20 to 50 gm. . One was of a capacity of 150 gm and had a zirconium lining, the other was for 20 gm and had quartz tubes. (Incidentally, around 1936 major occurrences of zirconium ore were discovered near the station of Volnovakh. Mining of the ore was highly classified. Our laboratory (TsBL-2) had to write numerous letter to Moscow before we were able to get two bags of ore needed in our research work.

14. The results of research were not always used in the production process.
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16. In general, TsBL-2 dealt with the following research problems:

a. Improvement of steel for ship armor.
b. Substitution of the expensive non-ferrous metals with more economical metals.
c. reduction of the relatively high percentage of defective production.

50X1 the research was effective, however. Poor results were due to the following:

a. Lack of initiative. Workers were afraid to be responsible in case of failure. Everything was therefore done only with the permission of a superior, who was often more afraid. As a result even minor problems had to be resolved by "higher-ups". Even a worker who showed too much

interest was regarded with suspicion.

[redacted]

c. Lack of discussion and comparison of opinions and problems among the workers by direct orders.

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d. Reluctance on the part of superiors to give good instructions because of their ignorance of what was classified secret.

e. The effect on research workers of political campaigns such as "shock work, socialist competition, fulfillment plan quotas" and other pressure ideas. This had a negative effect on our work. Frequently, in order not to be put on the "black list", the workers would "fix" work reports. In research work, just as in all other phases of Soviet life, fear, a formal bureaucratic attitude, fraud and falsification were the main features.

17. In addition to TsBL-2 laboratory the plant also had a mechanical laboratory where the mechanical qualities of products were subjected to tensile, hardness and elasticity tests.

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ENCLOSURE (A): Sketches Showing Layouts of Plant B and Plant A

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ENCLOSURE (A)

SKETCHES SHOWING LAYOUTS OF PLANT B AND PLANT A 50X1